

The invention claimed is:

1. A method of coating a substrate with a material, the method comprising the steps of:

providing a substrate, an A-side reactant comprising an isocyanate, and a B-side reactant comprising an esterified polyol and a catalyst wherein:

the esterified polyol comprises the reaction product of a first polyol and a vegetable oil; and

the first polyol comprises the reaction product of a first multifunctional compound and a second multifunctional compound;

directing the A-side and B-side reactants toward the substrate; and

applying the A-side and B-side reactants to the substrate to form a urethane material that contacts the substrate.

2. The method of claim 1, wherein the A-side and B-side are applied simultaneously.

3. The method of claim 1, wherein the A-side and B-side are applied to the substrate through an applicator.

4. The method of claim 3, wherein the applicator has an A-side outlet and a B-side outlet.

5. The method of claim 4, wherein the applicator comprises a single fixture, said A-side and B-side outlet being carried by said single fixture.

6. The method of claim 4, wherein the applicator comprises a plurality of fixtures, said A-side outlet and said B-side outlet being carried by different fixtures.

7. The method of claim 1, wherein the A-side reactants and the B-side reactants are applied to the substrate by more than one applicator.

8. The method of claim 1, wherein the first multifunctional compound comprises an active hydrogen containing compound.

9. The method of claim 8, wherein the active hydrogen containing compound comprises a multifunctional alcohol.

10. The method of claim 1, wherein the second multifunctional compound comprises a saccharide compound.

11. The method of claim 1, wherein the vegetable oil is blown.

12. The method of claim 1, wherein the vegetable oil comprises a vegetable oil chosen from palm oil, safflower oil, canola oil, soy oil, cottonseed oil, and rapeseed oil.

13. The method of claim 1, wherein the vegetable oil comprises a blown vegetable oil chosen from blown palm oil, blown safflower oil, blown canola oil, blown soy oil, blown cottonseed oil, and blown rapeseed oil.

14. The method of claim 10, wherein the saccharide compound comprises a saccharide compound chosen from monosaccharides, disaccharides, oligosaccharides, sugar alcohols, and honey.

15. The method of claim 10, wherein the saccharide compound comprises glucose.

16. The method of claim 10, wherein the saccharide compound comprises sorbitol.

17. The method of claim 10, wherein the saccharide compound comprises cane sugar.

18. The method of claim 1, wherein the multifunctional alcohol comprises a multifunctional alcohol chosen from glycerin, butanediol, ethylene glycol, tripropylene glycol, dipropylene glycol, and aliphatic amine tetrol.

19. The method of claim 1, wherein the B-side further comprises a cross-linker.

20. The method of claim 29, wherein the cross-linker comprises a cross-linker chosen from glycerin, ethylene glycol, butanediol, dipropylene glycol, tripropylene glycol, and aliphatic amine tetrol.

21. The method of claim 1, wherein the B-side further comprises a blowing agent.

22. The method of claim 21, wherein the blowing agent comprises a blowing agent chosen from water, acetone, methyl isobutyl ketone, methylene chloride, a hydrochlorofluorocarbon, and a hydrofluorocarbon.

23. The method of claim 1, wherein the isocyanate comprises a diisocyanate compound.

24. The method of claim 1, wherein the isocyanate comprises an isocyanate chosen from 2,4 diisocyanate, 4,4' diphenylmethane diisocyanate, 2,4 diphenylmethane diisocyanate, and toluene diisocyanate.

25. The method of claim 1, wherein the isocyanate comprises a prepolymer comprising the reaction product of a vegetable oil and an isocyanate.

26. The method of claim 1, wherein the B-side further comprises a petroleum based polyol.

27. The method of claim 26, wherein the petroleum based polyol comprises a petroleum based polyol chosen from polyether polyol, polyester polyol, and polyurea polyol.

28. The method of claim 1, wherein the B-side further comprises a polyurea polyol.
29. The method of claim 1, wherein the substrate comprises a boat hull.
30. The method of claim 1, wherein the substrate comprises a vehicle bed.
31. The method of claim 1, wherein the substrate comprises a housing material.
32. The method of claim 31, wherein the housing material comprises a housing material chosen from the group consisting of roof material, foundation material, concrete material, metal material, and wood material.
33. The method of claim 1, wherein the esterified polyol is reacted with an alkyl oxide.
34. The method of claim 31, wherein the alkyl oxide comprises an alkyl oxide chosen from the group comprising propylene oxide, butylene oxide, and ethylene oxide.
35. The method of claim 1, wherein the substrate comprises a carpet material.
36. The method of claim 26, wherein the substrate comprises a carpet material.
37. The method of claim 27, wherein the substrate comprises a carpet material.

38. A method of coating a substrate with a material comprising:  
providing a substrate, an applicator comprising an A-side intake, an A-side outlet, a B-side intake, a B-side outlet, and a nozzle head and an A-side reactant comprising an isocyanate and a B-side reactant wherein the B-side reactant comprises a vegetable oil, a cross-linking agent comprised of a multifunctional alcohol, and a catalyst; and  
passing the A-side reactant through the A-side intake of the applicator and the B-side reactant through the B-side intake of the applicator such that the A-side and the B-side reactants pass through the A-side and B-side outlets and contact the substrate.

39. The method of claim 38, wherein the B-side further includes a blowing agent.

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A2 40. The method of claim 38, wherein the vegetable oil comprises a vegetable chosen from the group comprising soy oil, rapeseed oil, cottonseed oil, or palm oil.

41. The method of claim 38, wherein the vegetable oil comprises blown soy oil.

42. The method of claim 38, wherein the catalyst is a tertiary amine.

43. The method of claim 38, wherein the multifunctional alcohol is present in a ratio to the vegetable oil such that there are at least 0.7 moles of hydroxyl (OH) groups per mole of vegetable oil.

44. The method of claim 38, wherein the isocyanate comprises an isocyanate chosen from the group comprising 2,4 diisocyanate, 4,4' diphenylmethane diisocyanate, and 2,4 diphenylmethane diisocyanate.

45. The method of claim 38, wherein the B-side further comprises a surfactant.

46. The method of claim 38, wherein the isocyanate comprises a mixture of at least two isocyanates.

47. The method of claim 46, wherein the isocyanate comprises a mixture of at least two isocyanates selected from the group consisting of 2,4 diisocyanate, 4,4' diphenylmethane diisocyanate, and 2,4 diphenylmethane diisocyanate.

48. The method of claim 39, wherein the blowing agent comprises a blowing agent chosen from the group comprising water, acetone, methyl isobutyl ketone, methylene chloride, a hydrochlorofluorocarbon, or a hydrofluorocarbon.

49. The method of claim 38, wherein the cross-linker comprises a cross-linker selected from the group comprising ethylene glycol, 1,4, butanediol, and dipropylene glycol.

50. The method of claim 38, wherein the cross-linker comprises a combination of ethylene glycol and 1,4 butanediol.

51. The method of claim 38, wherein the B-side further comprises a petroleum-based polyol.

52. The method of claim 51, wherein the petroleum-based polyol comprises a polyurea polyol.

53. The method of claim 37, wherein the B-side further comprises a polyurea polyol.

54. The method of claim 1, wherein the substrate comprises a boat hull.

55. The method of claim 1, wherein the substrate comprises a vehicle component.

56. The method of claim 55, wherein the vehicle component comprises a vehicle cargo area.

57. The method of claim 56, wherein the vehicle cargo area comprises a truck bed.

58. The method of claim 1, wherein the substrate comprises a building material.

59. The method of claim 34, wherein the building material comprises a building material chosen from the group consisting of roof material, foundation material, concrete material, metal materials, and wood material.

60. The method of claim 38, wherein the substrate comprises a carpeting material.

61. The method of claim 38, wherein the vegetable oil is reacted with an alkyl oxide.

62. The method of claim 61, wherein the alkyl oxide comprises an alkyl oxide chosen from the group comprising propylene oxide, butylene oxide, and ethylene oxide.

63. A boat hull liner composite comprising:

a boat hull; and

a urethane material wherein the urethane material comprises the reaction product of an A-side comprising an isocyanate and a B-side comprising an esterified polyol and a catalyst wherein the esterified polyol comprises the reaction product of a first polyol and a vegetable oil and the first polyol comprises the reaction product of a first multifunctional compound and a second multifunctional compound and wherein the urethane material at least partially covers the boat hull.

64. The boat hull liner of claim 63, wherein the esterified polyol is reacted with an oxylation compound.

65. A boat hull liner composite comprising:

a boat hull; and

a urethane material at least partially covering the boat hull wherein the urethane material comprises an A-side comprising an isocyanate and a B-side wherein the B-side comprises a vegetable oil, a cross-linking agent, and a catalyst.

66. The boat hull liner of claim 65, wherein the vegetable oil is reacted with an oxylation compound.

67. A building material composite comprising:  
a building substrate at least partially combined with a urethane material wherein the urethane material comprises the reaction product of an A-side comprising an isocyanate and a B-side comprising an esterified polyol and a catalyst wherein the esterified polyol comprises the reaction product of a first polyol and a vegetable oil and the first polyol comprises the reaction product of a first multifunctional compound and a second multifunctional compound.

68. The building material of claim 67, wherein the esterified product is reacted with an oxylation compound.

69. The building material of claim 67, wherein the building substrate comprises a building substrate chosen from the group comprising wood, concrete, asphalt, and metal.

70. A building material composite comprising:  
a building substrate at least partially lined with a urethane material wherein the urethane material comprises the reaction product of an A-side comprising an isocyanate and a B-side comprising a vegetable oil, a cross-linking agent, and a catalyst.

71. The building material of claim 70, wherein the vegetable oil is reacted with an oxylation compound.

72. The building material of claim 70, wherein the building substrate comprises a building substrate chosen from the group comprising wood, concrete, asphalt, and metal.

73. A method of manufacturing a carpet material comprising:  
providing a carpet substrate, an applicator having an A-side intake, a B-side intake, and at least one nozzle head, an A-side comprising an isocyanate, and a B-side comprising an esterified polyol and a catalyst wherein the esterified polyol comprises the reaction product of a



first polyol and a vegetable oil and the first polyol comprises the reaction product of a first multifunctional compound and a second multifunctional compound;

directing the applicator toward the substrate; and

passing the A-side through the A-side intake of the applicator and the B-side through the B-side intake of the applicator such that the A-side and B-side react and contact the carpet substrate.

74. The method of manufacturing a carpet material of claim 73 further comprising the step of moving the applicator to substantially evenly coat the carpet substrate.

75. The method of manufacturing a carpet material of claim 74, wherein the movement of the applicator is controlled by a computer.

76. The method of manufacturing a carpet material of claim 75, wherein the applicator moves along an X-axis and a Y-axis.

77. The method of claim 73, wherein the first multifunctional compound comprises a multifunctional alcohol and the second multifunctional compound comprises a saccharide compound.

78. The carpet material produced according to claim 73.

79. A method of coating a substrate with a material comprising:  
providing a substrate; a spray applicator comprising an A-side inlet, a B-side inlet, and a sprayer head comprising an A-side outlet and a B-side outlet; an A-side reactant comprising an isocyanate and a B-side reactant comprising an esterified polyol, a petroleum based polyol, and a catalyst wherein the esterified polyol comprises the reaction product of a first polyol and a vegetable oil, the first polyol comprises the reaction product of a first multifunctional compound and a second multifunctional compound;

directing the spray applicator toward the substrate;

passing the A-side reactant through the A-side intake of the applicator and the B-side reactant through the B-side intake of the applicator; and

passing the A-side reactant and the B-side reactant through the sprayer head such that the A-side and B-side reactants react and contact the substrate material.

80. The material produced by the method of claim 79.

81. The method of claim 78, wherein the first multifunctional compound comprises a multifunctional alcohol and the second multifunctional compound comprises a saccharide compound.

82. The method of claim 79, wherein the petroleum based polyol comprises a petroleum based polyol chosen from polyether polyol, polyester polyol, and polyurea polyol.

83. A method of coating a substrate with a material comprising:  
providing a substrate; a spray applicator comprising an A-side inlet, a B-side inlet, and a sprayer head comprising an A-side outlet and a B-side outlet; an A-side reactant comprising an isocyanate; and a B-side reactant comprising a vegetable oil, a petroleum based polyol, a cross-linker, and a catalyst;

directing the spray applicator toward the substrate;  
passing the A-side reactant through the A-side intake of the applicator and the B-side reactant through the B-side intake of the applicator; and

passing the A-side reactant and the B-side reactant through the sprayer head such that the A-side and B-side reactants react and contact the substrate material.

84. The method of claim 83, wherein the petroleum based polyol comprises a petroleum based polyol chosen from polyether polyol, polyester polyol, and polyurea polyol.

85. The material produced according to claim 83.

86. A vehicle component liner composite comprising:

a vehicle component; and

a urethane material wherein the urethane material comprises the reaction product of an A-side comprising an isocyanate and a B-side comprising an esterified polyol and a catalyst wherein the esterified polyol comprises the reaction product of a first polyol and a vegetable oil and the first polyol comprises the reaction product of a first multifunctional compound and a second multifunctional compound and wherein the urethane material at least partially covers the vehicle component.

87. The vehicle component liner of claim 86, wherein the esterified polyol is reacted with an oxylation compound.

88. The vehicle component liner of claim 86, wherein the vehicle component comprises a vehicle cargo area.

89. The vehicle component liner of claim 88, wherein the vehicle cargo area comprises a truck bed.

90. A vehicle component liner composite comprising:  
a vehicle component; and  
a urethane material at least partially covering the vehicle component wherein the urethane material comprises an A-side comprising an isocyanate and a B-side wherein the B-side comprises a vegetable oil, a cross-linking agent, and a catalyst.

91. The vehicle component liner of claim 90, wherein the vegetable oil is reacted with an oxylation compound.

92. The vehicle component liner of claim 91, wherein the vehicle component comprises a vehicle cargo area.

93. The vehicle component liner of claim 92, wherein the vehicle cargo area comprises a truck bed.